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Prevention of Varicella Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP)

Summary

In February 1999, the Advisory Committee on Immunization Practices (ACIP) expanded recommendations for varicella (chickenpox) vaccine to promote wider use of the vaccine for susceptible children and adults. The updated recommendations include establishing child care and school entry requirements, use of the vaccine following exposure and for outbreak control, use of the vaccine for some children infected with the human immunodeficiency virus (HIV), and vaccination of adults and adolescents at high risk for exposure. These recommendations also provide new information on varicella vaccine postlicensure safety data.

INTRODUCTION

Varicella (i.e., chickenpox) is a highly contagious disease caused by the varicella zoster virus (VZV). Varicella is usually a self-limited disease that lasts 4-5 days and is characterized by fever, malaise, and a generalized vesicular rash typically consisting of 250-500 lesions. Infants, adolescents, adults, and immunocompromised persons are at higher risk for complications. Before the availability of varicella vaccine, varicella disease was responsible for an estimated 4 million cases, 11,000 hospitalizations, and 100 deaths each year in the United States (CDC, unpublished data, 1999). Approximately 90% of cases occurred in children. A vaccine was licensed in the United States in 1995, and the Advisory Committee on Immunization Practices (ACIP) issued recommendations for prevention of varicella in July 1996 (1).

RECOMMENDATIONS

Day Care and School Entry Requirements

Because varicella incidence is highest among children aged 1-6 years, implementing vaccination requirements for child care and school entry will have the greatest impact on reducing disease incidence. ACIP recommends that all states require that children entering child care facilities and elementary schools either have received varicella vaccine or have other evidence of immunity to varicella. Other evidence of immunity should consist of a physician's diagnosis of varicella, a reliable history of the disease, or serologic evidence of immunity. To prevent susceptible older children from entering adulthood without immunity to varicella, states should also consider implementing a policy that requires evidence of varicella vaccination or other evidence of immunity for children entering middle school (or junior high school).

Postexposure Vaccination and Outbreak Control

Data from the United States and Japan from household, hospital, and community settings indicate that varicella vaccine is effective in preventing illness or modifying varicella severity if used within 3 days, and possibly up to 5

days, of exposure (2-4). ACIP now recommends the vaccine for use in susceptible persons following exposure to varicella. If exposure to varicella does not cause infection, postexposure vaccination should induce protection against subsequent exposure. If the exposure results in infection, no evidence indicates that administration of varicella vaccine during the presymptomatic or prodromal stage of illness increases the risk for vaccine-associated adverse events. Although postexposure use of varicella vaccine has potential applications in hospital settings, vaccination is routinely recommended for all susceptible health-care workers and is the preferred method for preventing varicella in health-care settings (1,5).

Varicella outbreaks in some settings (e.g., child care facilities, schools, institutions) can last 3-6 months. Varicella vaccine has been used successfully by state and local health departments and by the military for outbreak prevention and control. Therefore, state and local health departments should consider using the vaccine for outbreak control either by advising exposed susceptible persons to contact their health-care providers for vaccination or by offering vaccination through the health department. Guidelines for varicella outbreak investigation and control are available from the National Immunization Program (NIP), CDC.

Vaccination of Persons Aged greater than or equal to 13 Years at High Risk for Exposure or Transmission

ACIP has strengthened its recommendations for susceptible persons aged greater than or equal to 13 years at high risk for exposure or transmission, including designating adolescents and adults living in households with children as a new high-risk group. Varicella vaccine is recommended for susceptible persons in the following high-risk groups: a) persons who live or work in environments where transmission of VZV is likely (e.g., teachers of young children, day care employees, and residents and staff members in institutional settings), b) persons who live and work in environments where transmission can occur (e.g., college students, inmates and staff members of correctional institutions, and military personnel), c) nonpregnant women of childbearing age, d) adolescents and adults living in households with children, and e) international travelers.

Vaccination of HIV-Infected Children and Other Persons With Altered Immunity

Varicella vaccine is not licensed for use in persons who have blood dyscrasias, leukemia, lymphomas of any type, or other malignant neoplasms affecting the bone marrow or lymphatic systems. The manufacturer makes free vaccine available to any physician through a research protocol for use in patients who have acute lympho-blastic leukemia (ALL) and who meet certain eligibility criteria (1). ACIP has previously recommended that varicella vaccine should not be administered to persons with primary or acquired immunodeficiency, including immunosuppression associated with acquired immunodeficiency syndrome (AIDS) or other clinical manifestations of human immunodeficiency virus (HIV) infections, cellular immunodeficiencies, hypogammaglobulinemia, and dysgammaglobulinemia. ACIP maintains its recommendation that varicella vaccine should not be administered to persons who have cellular immunodeficiencies, but persons with impaired humoral immunity may now be vaccinated. In addition, some HIV-infected children may now be considered for vaccination. Limited data from a clinical trial in which two doses of varicella vaccine were administered to 41 asymptomatic or mildly symptomatic HIV-infected children (CDC class N1 or A1,* age-specific CD4+ T-lymphocyte percentage of greater than or equal to 25%) (6) indicated that the vaccine was immunogenic and effective (Pediatric AIDS Clinical Trial Group, unpublished data, 1999). Because children infected with HIV are at increased risk for morbidity from varicella and herpes zoster (i.e., shingles) compared with healthy children, ACIP recommends that, after weighing potential risks and benefits, varicella vaccine should be considered for asymptomatic or mildly symptomatic HIV-infected children in CDC class N1 or A1 with age-specific CD4+ T-lymphocyte percentages of greater than or equal to 25%. Eligible children should receive two doses of varicella vaccine with a 3-month interval between doses. Because persons with impaired cellular immunity are potentially at greater risk for complications after vaccination with a live vaccine, these vaccinees should be encouraged to return for evaluation if they experience a postvaccination varicella-like rash. The use of varicella vaccine in other HIV-infected children is being investigated

further. Recommendations regarding use of varicella vaccine in persons with other conditions associated with altered immunity (e.g., immunosuppressive therapy) or in persons receiving steroid therapy have not changed (1).

ADVERSE REACTIONS

Reporting of Postlicensure Adverse Events

Data on potential adverse events are available from the Vaccine Adverse Event Reporting System (VAERS). During March 1995-July 1998, a total of 9.7 million doses of varicella vaccine were distributed in the United States. During this time, VAERS received 6,580 reports of adverse events, 4% of them serious. Approximately two thirds of the reports were for children aged less than 10 years. The most frequently reported adverse event was rash (rate: 37/100,000 vaccine doses distributed). Polymerase chain reaction (PCR) analysis confirmed that most rash events occurring within 2 weeks of vaccination were caused by wild-type virus (Merck and Company, Inc., unpublished data, 1998). Postlicensure VAERS and vaccine manufacturer reports of serious adverse events, without regard to causality, have included encephalitis, ataxia, erythema multiforme, Stevens-Johnson syndrome, pneumonia, thrombocytopenia, seizures, neuropathy, and herpes zoster (CDC, unpublished data, 1998). For serious adverse events for which background incidence data are known, VAERS reporting rates are lower than the rates expected after natural varicella or the background rates of disease in the community (CDC, unpublished data, 1998). However, VAERS data are limited by underreporting and unknown sensitivity of the reporting system, making it difficult to compare adverse event rates following vaccination reported to VAERS with those from complications following natural disease. Nevertheless, the magnitude of these differences makes it likely that serious adverse events following vaccination occur at a substantially lower rate than following natural disease. In rare cases, a causal relationship between the varicella vaccine and a serious adverse event has been confirmed (e.g., pneumonia in an immunocompromised child or herpes zoster). In some cases, wild-type VZV or other causal organisms have been identified. However, in most cases, data are insufficient to determine a causal association. Of the 14 deaths reported to VAERS, eight had definite other explanations for death, three had other plausible explanations for death, and three had insufficient information to determine causality. One death from natural varicella occurred in a child aged 9 years who died from complications of wild-type VZV 20 months after vaccination.

Development of Herpes Zoster

The VAERS rate of herpes zoster after varicella vaccination was 2.6/100,000 vaccine doses distributed (CDC, unpublished data, 1998). The incidence of herpes zoster after natural varicella infection among healthy children aged less than 20 years is 68/100,000 person years (7) and, for all ages, 215/100,000 person years (8). However, these rates should be compared cautiously because the latter rates are based on populations monitored for longer time periods than were the vaccinees. For PCR-confirmed herpes zoster cases, the range of onset was 25-722 days after vaccination (Merck and Company, Inc., unpublished data, 1998). Cases of herpes zoster have been confirmed by PCR to be caused by both vaccine virus and wild-type virus, suggesting that some herpes zoster cases in vaccinees might result from antecedent natural varicella infection (Merck and Company, Inc., unpublished data, 1998) (9).

Transmission of Vaccine Virus

Transmission of the vaccine virus is rare and has been documented in immunocompetent persons by PCR analysis on only three occasions out of 15 million doses of varicella vaccine distributed. All three cases resulted in mild disease without complications. In one case, a child aged 12 months transmitted the vaccine virus to his pregnant mother (10). The mother elected to terminate the pregnancy, and fetal tissue tested by PCR was negative for varicella vaccine virus. The two other documented cases involved transmission from healthy children aged 1 year to a healthy sibling aged 4 1/2 months and a healthy father, respectively. Secondary transmission has not been

documented in the absence of a vesicular rash postvaccination.

CONCLUSION

This report updates previous ACIP recommendations for the prevention of varicella. Implementing state requirements that children entering day care facilities and schools either have received varicella vaccine or have evidence of immunity will increase vaccine coverage. Vaccination is now recommended for outbreak control and postexposure, and the vaccine is now available to children with humoral immunodeficiencies and selected children with HIV infection (i.e., in CDC Class N1 or A1, with age-specific CD4+ T-lymphocyte percentages of greater than or equal to 25%). Recommendations for adult vaccination have been strengthened for persons at high risk for exposure and now include adolescents and adults who live in households with children.

References

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* In CDC's pediatric HIV Classification system, Class 1 is an immunologic category defined as "no evidence of suppression." For this ACIP recommendation, two clinical categories under Class 1 are used -- NI, defined as "no signs or symptoms," and AI, defined as "mild signs or symptoms."